Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (previously presented): A process for providing a hydrogen-containing gas stream to at least one fuel cell anode, comprising:

introducing a hydrogen-containing feed gas stream that includes at least one contaminant into a rotary adsorption module having at least a first adsorbent and at least one second material selected from a second adsorbent, a steam reforming catalyst, or a water gas shift reaction catalyst, wherein the first adsorbent and the second adsorbent are chemically distinct and at least one of the first adsorbent or the second adsorbent preferentially adsorbs the contaminant in the hydrogen-containing feed gas stream to produce a purified hydrogen-containing gas stream; and

introducing the purified hydrogen-containing gas stream to the fuel cell anode.

Claim 2 (previously presented): The process according to claim 1, wherein the contaminant is carbon monoxide and at least one of the first adsorbent or second adsorbent comprises a carbon monoxide-selective adsorbent.

Claim 3 (previously presented): The process according to claim 2, wherein the carbon monoxide-selective adsorbent is Na-LSX, Ca-LSX, Li-LSX, Li-exchanged chabazite, Ca-exchanged chabazite, Sr-exchanged chabazite, a Cu(I)-containing material, a Ag(I)-containing material, or a mixture thereof.

Claim 4 (original): The process according to claim 1, further comprising introducing the hydrogen-containing feed gas stream into the adsorption module at a temperature of about 80°C to about 200°C.

Claim 5 (original): The process according to claim 1, further comprising at least one additional adsorbent.

Claim 6 (original): The process according to claim 1, wherein the adsorption module comprises a rotary pressure swing adsorption module.

Claim 7 (original): The process according to claim 1, wherein the fuel cell comprises a polymer electrolyte membrane fuel cell.

Claim 8 (original): The process according to claim 1, further comprising providing a reforming or partial oxidation system that produces the hydrogen-containing feed gas stream.

Claim 9 (previously presented): The process according to claim 2, wherein the carbon monoxide-selective adsorbent is a Cu(I)-containing material, a Ag(I)-containing material, or a mixture thereof.

Claim 10 (original): The process according to claim 1, wherein the first adsorbent preferentially adsorbs carbon dioxide compared to water vapor.

Claim 11 (original): The process according to claim 1, wherein the first adsorbent comprises an alkali-promoted material and at least one of the steam reforming catalyst and the water gas shift reaction catalyst is present.

Claim 12 (previously presented): The process according to claim 11, wherein the steam reforming catalyst is a methanol steam reforming catalyst or a methane steam reforming catalyst.

Claim 13 (currently amended): A process for providing a hydrogen-containing gas stream to at least one fuel cell anode, comprising:

introducing a hydrogen-containing feed gas stream that includes at least a first contaminant and at least a second contaminant into a pressure swing adsorption module that includes a first separation zone and a second separation zone;

preferentially separating at least a portion of the first contaminant from the hydrogen-containing feed gas stream in the first separation zone;

preferentially separating at least a portion of the second contaminant from the hydrogen-containing feed gas stream in the second separation zone; and

introducing the resulting purified hydrogen-containing gas stream to the fuel cell anode,

wherein the first or second contaminant comprises carbon monoxide and the process further comprises reacting the carbon monoxide with water vapor in the first or second separation zones.

Claim 14 (canceled).

Claim 15 (original): The process according to claim 13, wherein the preferential separation of the first contaminant occurs prior to the preferential separation of the second contaminant.

Claim 16 (original): The process according to claim 13, wherein the first separation zone comprises a first adsorbent bed and the second separation zone comprises a second adsorption bed.

Claim 17 (canceled).

Claim 18 (original): The process according to claim 13, wherein the hydrogen-containing feed gas stream is produced by a reforming or partial oxidation system.

Claim 19 (original): The process according to claim 13, wherein the fuel cell comprises a polymer electrolyte membrane fuel cell.

Claim 20 (original): The process according to claim 13, further comprising preferentially separating at least one additional contaminant in at least one additional separation zone.

Claims 21-24 (canceled).

Claim 25 (previously presented): A process for separating carbon monoxide from a hydrogen-containing gas stream that is provided to at least one fuel cell anode, comprising:

introducing a hydrogen-containing feed gas stream that includes carbon monoxide into at least one rotary pressure swing adsorption module, wherein the rotary pressure swing adsorption module includes at least one adsorbent selected from Na-LSX, Ca-LSX, Li-LSX, Li-exchanged chabazite, Ca-exchanged chabazite, Sr-exchanged chabazite, a Cu(I)-containing material, a Ag(I)-containing material, or a mixture thereof;

separating at least a portion of the carbon monoxide from the hydrogen-containing feed gas stream; and

introducing the resulting purified hydrogen-containing gas stream into the fuel cell anode.

Claim 26 (original): The process according to claim 25, wherein the adsorbent comprises a Cu(I)-containing material, a Ag(I)-containing material, or a mixture thereof.

Claim 27 (previously presented): A process for providing a hydrogen-containing gas stream to at least one fuel cell anode, comprising:

introducing a hydrogen-containing gas stream that includes carbon monoxide into a rotary pressure swing adsorption module that includes at least one carbon monoxide-selective adsorbent to produce a purified hydrogen-containing gas stream; and

introducing the purified hydrogen-containing gas stream to the fuel cell anode.

Claim 28 (original): A process according to claim 27, wherein the carbon monoxide-selective adsorbent comprises a Cu(I)-containing material, a Ag(I)-containing material, or a mixture thereof.

Claims 29-30 (canceled).

Claim 31 (previously presented): An electrical current generating system comprising:

a hydrogen-containing gas source;

at least one rotary adsorption module that can at least partially purify the hydrogen-containing gas, wherein the adsorption module includes at least a first adsorbent and at least one second material

selected from a second adsorbent, a steam reforming catalyst, or a water gas shift reaction catalyst, the first adsorbent and the second adsorbent being chemically distinct; and

at least one fuel cell defining an anode inlet that can receive the purified hydrogen-containing gas stream from the adsorption module.

Claim 32 (original): The system according to claim 31, wherein the hydrogen-containing gas source comprises a reformer or partial oxidation reactor.

Claim 33 (original): The system according to claim 31, wherein the adsorption module comprises a rotary pressure swing adsorption module.

Claim 34 (original): The system according to claim 31, wherein the first adsorbent is disposed in a first zone and the second material is disposed in a second zone.

Claim 35 (original): The system according to claim 34, wherein the first zone and the second zone are disposed adjacently along a hydrogen-containing gas flow path defined in the adsorption module.

Claim 36 (original): The system according to claim 31, further comprising an anode recirculation conduit fluidly communicating between a fuel cell anode outlet and an inlet defined in the adsorption module.

Claim 37 (original): The system according to claim 31, wherein at least one of the first adsorbent or second adsorbent comprises a carbon monoxide-selective adsorbent.

Claim 38 (previously presented): The system according to claim 37, wherein the carbon monoxide-selective adsorbent is Na-LSX, Ca-LSX, Li-LSX, Li-exchanged chabazite, Ca-exchanged chabazite, Sr-exchanged chabazite, a Cu(I)-containing material, a Ag(I)-containing material, or a mixture thereof.

Claim 39 (previously presented): The system according to claim 31, wherein the steam reforming catalyst or the water gas shift reaction catalyst is a Cu-ZnO catalyst, a transition metal carbonyl complex catalyst, or a catalyst comprising a transition group metal inserted into a zeolite cage.

Claim 40 (original): The system according to claim 34, further comprising at least one additional zone of at least one additional adsorbent.

Claim 41 (original): The system according to claim 31, wherein the first adsorbent preferentially adsorbs carbon dioxide compared to water vapor and at least one of the steam reforming catalyst or the water gas shift reaction catalyst is present.

Claim 42 (original): The system according to claim 41, wherein the first adsorbent comprises an alkali-promoted material.

Claim 43 (previously presented): The system according to claim 31, wherein the carbon monoxide-selective adsorbent is a Cu(I)-containing material, a Ag(I)-containing material, or a mixture thereof.

Claims 44-87 (canceled).

Claim 88 (previously presented): The system according to claim 31, wherein at least one of the first adsorbent or second adsorbent comprises a zeolite, an activated carbon, or a Cu(I)-containing material.

Claim 89 (previously presented): The system according to claim 32, wherein the reformer or partial oxidation reactor comprises a first burner and a second burner.

Claim 90 (previously presented): The system according to claim 89, wherein the first burner receives an exhaust gas from the adsorption module and the second burner receives a hydrocarbon fuel.

Claim 91 (previously presented): An electrical current generating system comprising:

a hydrogen-containing gas source;

at least one rotary pressure swing adsorption module fluidly coupled to the hydrogen-containing gas source, the rotary pressure swing adsorption module including at least one carbon monoxide-selective adsorbent; and

at least one fuel cell anode fluidly coupled to the pressure swing adsorption module.

Claim 92 (previously presented): The system according to claim 91, wherein the carbon monoxide-selective adsorbent is a Cu(I)-containing material, a Ag(I)-containing material, or a mixture thereof.

Claim 93 (currently amended): A system for supplying hydrogen gas to a fuel cell anode, comprising:

a hydrogen gas generating system that includes an outlet for discharging a hydrogen-containing gas that includes at least a first contaminant and a second contaminant;

a rotary pressure swing adsorption module that includes a first contaminant separation zone that fluidly communicates with the outlet of the hydrogen gas generating system, and at least one second contaminant separation zone that fluidly communicates with the first contaminant separation zone and includes an outlet for discharging a purified hydrogen gas, wherein the first contaminant separation zone and the second contaminant separation zone are disposed within the rotary pressure swing adsorption module and the first contaminant separation zone comprises a first adsorbent and the second contaminant separation zone comprises a second adsorbent; and

at least one fuel cell anode that fluidly communicates with the outlet for the second contaminant separation zone.

Claim 94 (previously presented): The system according to claim 93, wherein the hydrogen gas generating system comprises a reformer or partial oxidation reactor and at least one of the first contaminant or second contaminant comprises a carbon oxide.

Claims 95-96 (canceled).

Claim 97 (previously presented): A system for supplying hydrogen gas to a fuel cell anode, comprising:

a hydrogen-containing gas source;

at least one rotary pressure swing adsorption module that can at least partially purify the hydrogen-containing gas, wherein the rotary pressure swing adsorption module includes at least one adsorbent selected from Na-LSX, Ca-LSX, Li-LSX, Li-exchanged chabazite, Ca-exchanged chabazite, Sr-exchanged chabazite, a Cu(I)-containing material, a Ag(I)-containing material, or a mixture thereof; and

at least one fuel cell having an anode inlet that can receive the purified hydrogen-containing gas stream from the rotary pressure swing adsorption module.

Claim 98 (previously presented): The system according to claim 97, wherein the adsorbent is a material that includes a Cu(I)-containing material, a Ag(I)-containing material, or a mixture thereof.

Claim 99 (previously presented): An electrical current generating system comprising:

at least one first pressure swing adsorption module having an outlet for discharging an oxygen-enriched gas stream;

an autothermal reforming or partial oxidation reactor that can combust fuel and the oxygen-enriched gas stream to produce a hydrogen-containing gas;

at least one second pressure swing adsorption module that can at least partially purify the hydrogen-containing gas; and

at least one fuel cell having an anode inlet that can receive the purified hydrogen-containing gas from the second pressure swing adsorption module.

Claim 100 (previously presented): A process for providing a hydrogen-containing gas stream and an oxygen-enriched gas stream to a fuel cell, comprising:

providing at least one first pressure swing adsorption module that produces an oxygen-enriched gas stream, the first pressure swing adsorption module including at least a first compressor or first

vacuum pump;

providing at least one second pressure swing adsorption module that produces a purified hydrogen gas stream and a separation exhaust gas stream, the second pressure swing adsorption module including at least a second compressor or second vacuum pump;

introducing the oxygen-enriched gas stream and the purified hydrogen gas stream into a fuel cell; and

introducing the separation exhaust gas stream as a fuel into a combustion engine for driving at least the first compressor, first vacuum pump, second compressor, second vacuum pump, or an electric generator.

Claim 101 (previously presented): The process according to claim 100, further comprising mixing a portion of the purified hydrogen gas stream with the separation exhaust gas stream as a fuel for the combustion engine.

Claim 102 (previously presented): The process according to claim 100, wherein the fuel cell produces a cathode exhaust gas stream that includes water and the process further comprises cooling the combustion engine with the water from the cathode exhaust gas stream.

Claim 103 (previously presented): The process according to claim 102, further comprising vaporizing the water from the combustion engine and introducing the resulting water vapor into a reformer that produces the hydrogen-containing gas feed stream.

Claim 104 (previously presented): The process according to claim 100, wherein the combustion engine produces an engine exhaust gas stream and the process further comprises heating a hydrogen gas generating system with the engine exhaust gas stream.

Claim 105 (previously presented): The process according to claim 100, further comprising:
mixing liquid water and a hydrocarbon fuel stream resulting in a coolant mixture;
introducing the coolant mixture into a coolant jacket juxtaposed with the combustion engine;
vaporizing the coolant mixture to form a steam/fuel vapor mixture;

subjecting the steam/fuel vapor mixture to reaction conditions sufficient for generating a hydrogen-containing gas stream; and

introducing the hydrogen-containing gas stream into the second pressure swing adsorption module.

Claim 106 (previously presented): A process for providing a hydrogen-containing gas stream to a fuel cell, comprising;

mixing liquid water and a hydrocarbon fuel stream resulting in a coolant mixture;

introducing a coolant mixture into a coolant passage defined in a fuel cell wherein the fuel cell also defines an anode inlet for receiving a hydrogen-containing gas stream;

vaporizing the coolant mixture to form a steam/fuel vapor mixture;

subjecting the steam/fuel vapor mixture to reaction conditions sufficient for generating a hydrogen-containing gas stream;

purifying the hydrogen-containing gas stream via pressure swing adsorption; and then

introducing the hydrogen-containing gas stream into the fuel cell anode inlet.

Claim 107 (previously presented): The process according to claim 106, wherein the hydrocarbon fuel stream comprises methanol, ethanol, or a mixture thereof.

Claim 108 (previously presented): The process according to claim 106, wherein the vaporizing of the coolant mixture comprises flash evaporating of the coolant mixture.

Claim 109 (canceled).

Claim 110 (previously presented): The process according to claim 106, wherein the steam/fuel vapor mixture is subjected to reforming or partial oxidation to generate the hydrogen-containing gas stream.

Claim 111 (previously presented): The process according to claim 106, wherein the fuel cell further defines a cathode outlet for discharging a cathode exhaust gas stream that includes cathode

water vapor, the process further comprising condensing at least a portion of the cathode water vapor, separating the resulting liquid water stream from the cathode exhaust gas stream, and mixing the liquid water stream with the hydrocarbon fuel stream.

Claim 112 (previously presented): An electrical current generating system, comprising:

at least one rotary pressure swing adsorption module that includes a first outlet for discharging a purified hydrogen gas and a second outlet for discharging a separation exhaust gas;

at least one fuel cell defining an anode inlet that fluidly communicates with the first outlet of the pressure swing adsorption module; and

a combustion engine defining a fuel inlet that fluidly communicates with the second outlet of the pressure swing adsorption module.

Claim 113 (canceled).

Claim 114 (previously presented): The system according to claim 112, further comprising at least one first pressure swing adsorption module that includes an outlet for discharging an oxygen-enriched gas stream and at least one compressor or pump, wherein a shaft coupled to the combustion engine drives at least the compressor or pump.

Claim 115 (previously presented): The system according to claim 112, wherein the fuel cell further defines a cathode outlet for discharging a cathode exhaust gas stream that includes water, the combustion engine further includes a cooling jacket, and the system further comprises a conduit fluidly communicating between the fuel cell cathode outlet and the combustion engine cooling jacket.

Claim 116 (previously presented): The system according to claim 112, further comprising a hydrogen gas generating system that fluidly communicates with the hydrogen gas separation module, wherein the hydrogen gas generating system comprises a reformer or partial oxidation reactor and the combustion engine further includes a cooling jacket that defines an outlet for a water stream that fluidly communicates with the reformer or partial oxidation reactor.

Claim 117 (previously presented): The system according to claim 112, wherein the fuel cell comprises a polymer electrolyte membrane fuel cell.

Claim 118 (previously presented): An electrical current generating system, comprising:

a fuel cell defining an anode inlet for receiving a hydrogen-containing gas stream, and a coolant passage having a coolant inlet and a coolant outlet;

a water source fluidly communicating with the coolant inlet;

a hydrocarbon fuel source fluidly communicating with the coolant inlet;

a hydrogen gas generating module that includes an outlet for discharging a hydrogen-containing gas stream and a fuel inlet that fluidly communicates with the coolant outlet; and

a first conduit fluidly communicating between the hydrogen gas generating module outlet and the fuel cell anode inlet, and with a first pressure swing adsorption module for purifying the hydrogen-containing gas stream that is positioned between the hydrogen gas generating module outlet and the fuel cell anode inlet.

Claim 119 (previously presented): The system according to claim 118, wherein the hydrocarbon fuel comprises methanol, ethanol, or a mixture thereof.

Claim 120 (previously presented): The system according to claim 118, wherein the first pressure swing adsorption module comprises a rotary pressure swing adsorption module.

Claim 121 (previously presented): The system according to claim 118, further comprising a second pressure swing adsorption module that includes an outlet for discharging an oxygen-enriched stream, and a third conduit fluidly communicating between the second pressure swing adsorption module outlet and a fuel cell cathode inlet.

Claim 122 (previously presented): The system according to claim 121, wherein the second pressure swing adsorption module comprises a rotary pressure swing adsorption module.

Claim 123 (previously presented): The system according to claim 118, wherein the fuel cell further defines a cathode outlet for discharging a cathode exhaust gas stream, and the system further comprises a second conduit fluidly communicating between the fuel cell cathode outlet and the coolant inlet.

Claims 124-125 (canceled).

Claim 126 (previously presented): The process according to claim 2, wherein the carbon monoxide-selective adsorbent comprises carbon fiber paper or carbon cloth.

Claim 127 (previously presented): The process according to claim 27, wherein the carbon monoxide-selective adsorbent comprises carbon fiber paper or carbon cloth.

Claim 128 (previously presented): The system according to claim 37, wherein the carbon monoxide-selective adsorbent comprises carbon fiber paper or carbon cloth.

Claim 129 (previously presented): The system according to claim 91, wherein the carbon monoxide-selective adsorbent comprises carbon fiber paper or carbon cloth.

Claim 130 (previously presented): The process according to claim 1, wherein at least one of the first adsorbent or second adsorbent comprises carbon fiber paper or carbon cloth.

Claim 131 (previously presented): The process according to claim 130, wherein the carbon fiber paper or carbon cloth adsorbent is self-supporting.

Claim 132 (previously presented): The system according to claim 31, wherein at least one of the first adsorbent or second adsorbent comprises carbon fiber paper or carbon cloth.

Claim 133 (previously presented): The system according to claim 132, wherein the carbon fiber paper or carbon cloth adsorbent is self-supporting.

Claim 134 (previously presented): The system according to claim 129, wherein the carbon fiber paper or carbon cloth adsorbent is self-supporting.

Claim 135 (previously presented): A system for supplying hydrogen gas to a fuel cell anode, comprising:

a hydrogen gas generating system that can produce a hydrogen-containing gas that includes at least a first contaminant and a second contaminant;

a first contaminant separation zone configured to receive the hydrogen-containing gas and produce a partially purified hydrogen-containing gas;

at least one second contaminant separation zone configured to receive the partially purified hydrogen-containing gas and produce a substantially purified hydrogen-containing gas; and

at least one fuel anode configured to receive the substantially purified hydrogen-containing gas,

wherein at least one of the first contaminant separation zone or the second contaminant separation zone is disposed within a rotary pressure swing adsorption module.

Claim 136-139 (canceled).

Claim 140 (previously presented): An electrical current generating system comprising:

a hydrogen-containing gas source;

at least one adsorption module that can at least partially purify the hydrogen-containing gas, wherein the adsorption module includes at least a first adsorbent and at least one second material selected from a second adsorbent, a steam reforming catalyst, or a water gas shift reaction catalyst, the first adsorbent and the second adsorbent being chemically distinct; and

at least one fuel cell defining an anode inlet that can receive the purified hydrogen-containing gas stream from the adsorption module,

wherein at least the first adsorbent or the second adsorbent is a material that includes a Cu(I)-containing material, a Ag(I)-containing material, or a mixture thereof.

Claim 141 (canceled).